REMARKS

The Office Action rejected claims 31-32 and 35-38 under 35 USC § 112. It is believed that this rejection is now moot in view of the amendment to those claims.

The Office Action acknowledged the validity of Applicant's remarks relative to the Ota U.S. Patent No. 5,570,226, Rakuljic et al. US Patent No. 5,691,989 and Craig et al. US Patent No. 6,167,075 by now relying upon the teachings of the Pillai US Patent No. 6,212,216 to reject the outstanding independent claims under 35 USC § 102. The Pillai reference was also cited against a number of the dependent claims under 35 USC § 103.

The Office Action contended that locating a plurality of light oscillators in a plurality of array elements and the design specifics of a grating would be known to a person of ordinary skill in this field and it would be simply a matter of obvious design choice. The Office Action further stated that since the Pillai reference taught a Bragg grating on a waveguide core that could reflect from a few percent to 99% of incident light it could be an adequate teaching of reflecting a necessary amount of light to optimize a phase locking as set forth in our present claims. Applicant respectfully traverses this position pursuant to MPEP § 706.02(a).

As set forth in our last Amendment response, the present invention provides a relatively low cost but high energy laser beam by uniquely arranging and phase locking an output from a plurality of relatively low cost semiconductor lasers that are positioned within an array. As noted in the teachings of our present application, the reflectivity from the incident plane of an optical element such as a diffraction grating is preferably within a range of 10-30% of the total laser beam to enable a majority output from each of the semiconductor laser elements to be both phase locked and to collectively be coordinated with a condenser lens to form a unitary high powered laser beam capable of performing applied applications such as cutting or burning holes.

The cited Pillai reference is not trying to achieve a relatively high powered laser beam that can serve as an engine for various applications such as cutting or burning holes, although using only relatively low cost semiconductor lasers positioned within an array, but rather is addressing what is contended to be a response to a need for diffraction limited laser sources of several hundred milliwatts of output power for pumping optical fiber amplifiers in communication networks. See Column 1, lines 44-52.

The Pillai reference recognizes a problem of introducing output beams from micro lasers into a single mode fiber coupling. Thus, a primary purpose is to provide a reshaping of an aspect ratio of the individual output beams so that they will collectively conform with the aspect ratio of the input aperture of the coupled optical waveguide. An appropriate anamorphic lens component is used to achieve an approximately circular symmetrical spot size that matches the input aperture of the coupled optical waveguide. To achieve this structure, different embodiments are disclosed including the embodiments of Figures 21A and Figure 23 which are relied upon in forming the current rejection of our outstanding claims.

In Figure 21A, a waveguide having a core 185 and a cladding 183 receives the output energy from an array of uncoupled emitters which are appropriately focused by an anamorphic lens 187 and a non-anamorphic lens 189 (which serves the function of a condenser lens). These lenses focus the input laser rays onto a single circular spot matching the aperture of the waveguide core. As shown in Figure 21A and more particularly, the box of the output coupler 181, a portion of the light is reflected backwards so that each emitter will see light from all the other emitters to in effect provide a mixing feature and any returned light mixed through the optical condensing anamorphic elements will be received by each of the laser light oscillators. The laser light in such a situation is not optimal for phase locking the laser light oscillators. The

spread angle would have the outer most laser light oscillators disfavored over the on-axis laser light oscillators. As can be appreciated, it can be extremely difficult to tune and know which returning laser light will be incident relative to each laser light oscillator from the other oscillators. As noted above, Pillai is not interested in producing an extremely powerful laser beam with high energy output, but rather is concerned about matching an input aperture of a coupled optical waveguide at a relatively low power for pumping optical fiber amplifiers in a communication network. The focused beam of an output from the condenser lens is certainly not for the purposes of cutting or burning a hole in the waveguide.

Figure 22 is an example of providing partial reflecting characteristic in the environment of optical communications such as a 4% reflection as disclosed in Column 10, line 52. In Figure 23 there is disclosed the use of a Bragg grating which is actually cut in the surface of the core of a silicon base fiber. In this regard, the use of a high powered laser source, such as an excimer laser is cited for the purposes of actually cutting the Bragg grating into the core by burning or cutting. The Bragg grating is then operable at a low power function for partially reflecting the incident laser light.

The Office Action relies upon the statement that a Bragg grating can be designed to have a back reflectivities ranging from a few percent to 99%. This statement, however, is not a teaching of any specific application in the Pillai disclosure, but simply an intrinsic property of any type of reflector that can be designed from almost total reflection to reflection of only a few percent such as the 4% referred in the embodiment of Figure 22. Presumably a person of ordinary skill in this field could potentially provide a 4% Bragg reflection characteristic to the core as one way of providing the partial reflectivity. This obviously does not address the range of reflectivity of 10-30% desired for providing a high powered laser output.

Presumably the teaching of the use of such a Bragg grating would be 1) on the core of the fiber optical waveguide and 2) in the range of 4% of partial reflection of optical energy. Additionally, the apparent mixing back through the optical lenses would not be designed to optimize either the energy output or the phase locking as utilized in the present invention as shown, for example, in the embodiments seen in Figures 5-8 of our present invention.

Referring to the present amendments to our independent claims, an arrangement of the compositional elements of the array of laser light oscillators and its interaction directly with the optical element or diffraction grating and subsequently the condenser lens to concentrate the output power is not taught nor suggested by the Pillai reference nor any of the other references of record. Certainly the Ota, Rakuljic et al. and the Craig et al. references do not teach such an arrangement, even if it was hypothetically assumed that this combination of references would be possible. In this regard, the Rakuljic et al. reference is directed to stabilizing a laser source with feedback from volume holograms. The Craig et al. and the Ota references are within an optical amplifier pumping system but the Ota reference does not teach the transmission of the majority of laser light through a diffraction grating and the Craig et al. reference is primarily teaching a system where the individual laser diode emitters have substantially no optical overlapping with each other and is addressing a redundancy in a light wave communication system to increase it's reliability. Collecting these references and their teachings would not be found within any suggestion within the Pillai reference and can only be cited in hind sight from the present application.

To establish a *prima facie* case of obviousness, the Examiner must demonstrate that one of ordinary skill in the art would have found both suggestions to construct the claimed structure, and a reasonable expectation of successfully doing so, in the prior art. *In re Vaeck*, 947 F.2d

488, 493, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991). Moreover, the Examiner bears the initial burden of supplying the factual basis for his position. *In re Warner*, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968). Although the Examiner may take official notice of technical facts outside of the record to fill the gaps that might exist in the evidentiary showing to satisfy his burden, such asserted technical facts must be "capable of such instant and unquestionable demonstration as to defy dispute." *In re Ahlert*, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970). However,

> [a]ssertions of technical facts in areas of esoteric technology must always be supported by citation to some reference work recognized as standard in the pertinent art and the appellant given, in the Patent Office, the opportunity to challenge the correctness of the assertion . . . [a]llegations concerning "knowledge" of the prior art, which might be peculiar to a particular art, should also be supported and the appellant similarly given the opportunity to make a challenge.
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> *Ahlert*, 424 F.2d at 1091, 165 USPQ at 420-1.

In summary, it is respectfully submitted that Applicant be given the opportunity to enter the proposed Rule 116 amendments to the claims in view of the new citation of the Pillai reference as the principle rejection if the case is not allowable. However, it is believed that the present independent claims more than adequately distinguish over the Pillai reference and that the case is now in condition for allowance. The dependent claims add additional novelty features over that of any combination of the references of record.

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If the Examiner believes that a telephone interview will help further the prosecution of this case, he is respectfully requested to contact the undersigned attorney at the listed telephone number.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on July 6, 2004.

By: James Lee

Signature

Dated: July 6, 2004

Very truly yours,

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